iSAFE (The Integrated Systems Automobile Failsafe Environment): Decreasing Infant Mortality Rates and Driver Distraction Using Microcontrollers and Embedded Circuits

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Thanks to the Baby Boomers of the 1950s and 60s, infant mortality rates extant today are fortunately much lower than that of early last century. However, distracted drivers are becoming much more prevalent today than in former years, and disastrous news and social media accounts have parents of young children more insecure than ever on the road. Despite this threat seeming external, statistics show that, besides parental drug use and kissing infants on the mouth, our own incorrectly secured baby car seats are the main causes of fatality. For this reason, our group has produced iSAFE (the Integrated Systems Automobile Failsafe Environment), a baby car seat retrofitted with force resistors, temperature sensors, LEDs, buzzers, proximity sensors, motors and bluetooth capability to protect the infant and safely notify the driver of insecure connections while creating minimal distraction. Two force resistors located on the bottom seat cushion and inside the chest harness work in tandem to detect the infant's presence and fastened harnesses, outputting responses to the LEDs. Temperature sensors located in the back of the chair measure both the infant's body heat and the vehicle's ambient temperature. If either exceed a certain threshold healthy for the infant, the environment's fan (motor) will be activated, and a warning notification will be sent to the driver's handsfree car speaker via bluetooth connection to the driver's phone. Additionally, an ultrasonic range sensor is connected to the chest harness to detect an infant's hand reaching to clasp the buckle, triggering a correctional buzzer. If the system is tampered with, disconnected, or runs out of batteries, the Blynk application installed on the driver's phone will send an alert that reads, "iSAFE is Offline".

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